He further remarks that in 1837 the wild orange groves south of Volusia and at New Smyrna were in full bearing, which shows that they were not much injured. In 1844 the writer saw very large sweet orange trees on Drayton Island bearing fruit, which could not have been killed down in 1835.

There has been some question as to the exact date of the freeze of 1835. I think there is no doubt that it occurred on the night of the 7th and morning of the 8th of February, 1835. Paragraphs in Nile's Register, February, 1835, state that the mercury was 1° below zero at Baltimore, and 1° above zero at Raleigh, N. C., on the morning of February 8, 1835. That month was excessively cold, the Chesapeake having been frozen so as to close navigation three times during that month. The mercury is reported to have been at 11° above zero at the same period at Fort King, Fla., then an army post near the present Ocala.

Dr. Baldwin of Jacksonville, an excellent authority, informed the Times-Union in 1886, that the date of the freeze in 1835 was the 8th of February, and the mercury stood at 8° above zero; and that about 1857, the day not given, the temperature was down to 16°. In 1857 the mercury fell to 26° at Tampa, 29° at Fort Pierce, and 30° at Fort Dallas, on the Miami. At Jacksonville the thermometer indicated, viz:

	°
January 16, 1857	16
December 28, 1872	27
January, 19, 1873	24
December 28, 1875	28
December 3, 1876	24
December 28, 1878	27
January 7, 1879	25
December 30, 1880	19
January 6, 1884	21
January 12, 1886	15

At Sorrento, on January 12, 1886, the thermometer indicated 19.

P. P. Bishop, in an address before the Fruit Growers' Convention, about 1872, said: "At Christmas, 1868, and again at Christmas, 1870, we had the two severest frosts that have been known in Florida since 1835. At each of these dates many young buds were ruined, many young seedlings frozen to the ground and much fruit destroyed."

With the foregoing statistics before us we are prepared to institute a comparison of the severe freezes we have had in Florida in 125 years at Jacksonville as a basing point.

	°
February, 3, 1766 (probably)	20
February 8, 1835	8
January 12, 1886	15
December 20, 1894	14
February 8, 1895	14

In 1766 the effects of the freeze were confined to loss of tropical plants, etc. That of 1835 destroyed all oranges, lemons, etc., north of 28° N. Lat. That of 1886 destroyed many young trees, and some old trees, but did not affect the crop of fruit in the following year in quantity, though it did in quality. The freezes of 1894-5 appear to have pretty generally killed down lemon trees, grape fruit, and young budded stock and many large trees; but according to present appearance (May 1895) old bearing trees will fruit for part of a crop the coming year.

In addition to the preceding, Mr. Fairbanks says:

Governor Glen of South Carolina, in a pamphlet published in London in 1761, says "that on the 7th of February, 1747, the temperature at Charleston was as low as 10° at 8 o'clock in the morning, and had been lower during the night; that all bearing orange trees were killed to the ground, and even an olive tree eighteen inches in diameter."

NOTE.—The lowest temperatures in Florida, as given by Schott in his temperature tables, are as follows:

Station.	Temperature.	Date.
Fort Barancas	10° F.	Jan., 1852
Fort Brooke	26	Jan., 1827, and 1857.
Fort Dallas	30	Jan., 1857
Fort Jefferson	42	Dec., 1868
Fort King	11	Feb., 1835
Fort Marion	21	Jan., 1831
Fort Meade	24	Jan., 1852
Fort Myers	31	Jan., 1852
Fort Pierce	29	Jan. and Dec., 1851 and 1857.
Indian Key	47	Feb., 1836
Key West	44	Jan., 1857

For South Carolina, Schott gives:

Station.	Temperature.	Date.
Charleston	16	Jan., 1852
Fort Moultrie	6	Feb., 1835

DROUGHTS IN THE MISSISSIPPI VALLEY.

The annual report of the Iowa Weather and Crop Service, for 1894, contains an admirable article by the Director of the Service, J. R. Sage, on the "Drought Problem." Among the many excellent sentences we quote the following:

The question most vitally affecting the dairy industry is that relating to the permanence of the climatic conditions. Confidence is the basis of all business activity. We know what the past has brought forth, but what of the future? Are our droughty summers and hot winds to be the rule, instead of the exception, for many years to come? * * * The unusual experience of the past season has stimulated public interest in some of the problems of meteorology, and people are making the discovery that the tables and records of the weather clerks are not merely dry figures, after all, nor wholly devoid of value to practical people. The droughty season stimulated the growth of a great variety of theories and speculations. Now, it is a good thing to quicken inquiry and investigation, but it is still better to obtain correct answers. An interrogation point, like a corkscrew, may uncork healing balm or deadly poison. Can we make it rain? Why this extraordinary shortage of rain? What is the matter with our climate? Is this aridity the result of drainage and cultivation? These are questions that have agitated the community.

The author goes on to maintain that we can not make it rain, that neither rain nor drought are caused by human agencies, but by gigantic natural forces infinitely above the grasp of finite man. He shows that the records for past years demonstrate great variability in climates and in crops, but nothing to prove a permanent change. He gives a letter from the Hon. Charles W. Irish, describing the great drought of the summer of 1846, in Iowa, which corresponded to, and was, perhaps, a continuation of the drought of 1845, in Ohio, and that of 1844, in New England. From all appearances these three droughts were quite as severe as those of 1893-1895. He further shows how possible it is that droughts may be compatible with good crops of grain, if not of grass. As droughts alternate with very wet seasons, there is, therefore, no evidence whatever that civilization has affected the climate so far as concerns cloud and rain. The weekly Weather Crop Bulletin shows that the rain that usually falls over Iowa has simply passed by, and brought an excess to other sections. As the past is the best possible guarantee for the future, therefore we may still expect dry and wet seasons in about the average number and average irregularity. It is not well for man to give up in despair and retreat from the lands that he has attempted to occupy, but rather learn how, by forethought, to conquer a success in spite of the difficulties that nature presents. "By thorough drainage, subsoiling, the conservation of moisture by means of shelter belts of timber, artificial ponds, and artesian or deep wells, we shall, in time, be able to produce abundant crops and water our stock, whether the seasons be wet or dry."

THE WEATHER IN DISTANT REGIONS.

It has been abundantly shown that the prediction of the weather for a long time in advance must depend largely upon our knowledge of the conditions prevailing at the time of the prediction in different portions of the globe. In order to lay a proper foundation for the study of this subject we must have monthly, if not daily, charts of the temperature, pressure, moisture and winds over the whole globe, such as have been prepared and partly published under the title of International Simultaneous Observations. These charts for the years 1875 to the present time have been used hitherto principally as a means of studying the motions of low areas, or what is called the general circulation of the atmosphere in the Northern Hemisphere. Such studies have already shown that the phenomena of the Southern Hemisphere obey the same laws as hold good in the Northern Hemisphere, but in much simpler combinations, and that maps of both hemispheres, when compared together, mutually elucidate each other. It sometimes happened that cold, dry, and clear seasons in the north temperate and arctic regions continued from six months before to six months after corresponding cold winters in the extreme southern temperate region. The latitudes visited by vessels that round Cape Horn are usually a little less than S. 60°, corresponding, therefore, to Behring Sea, southern Alaska, Cape Farewell, the Orkney Islands, Christiania and St. Petersburg, and, in fact, are very little farther south of the equator than the routes followed by the steamers from Glasgow to North America are north of the equator. The fact that there is so much more ice in these southern latitudes than in the corresponding northern latitudes must be attributed largely to the winds of the antarctic regions and the distribution of ocean and land. Any special increase or diminution in the ice, either arctic or antarctic, must result from a change in the winds; it may be in their direction, or force, or temperature, or moisture. Whatever the cause of that change in the wind, it must affect a large portion of the Southern Hemisphere appreciably. If, however, the ultimate cause consist, in some phenomenon peculiar to the equatorial regions, it may affect both the arctic and antarctic simultaneously. In fact such conditions may prevail over the whole north temperate zone as to influence the circulation of the atmosphere in the south temperate and antarctic regions, and this influence may either be direct and simultaneous, or indirect and only apparent after many months.

A consideration of the mechanics of the atmosphere justifies the collection and intercomparison of even the popular news items in the daily press describing special and abnormal phenomena in distant places. As far back as 1780 Dr. E. A. Holyoke, of Salem (Memoirs Am. Acad., Vol. II), made a comparison between the weather on opposite sides of the Atlantic Ocean, hoping to discover some simple reason for the contrasts between the two regions. We, on the other hand, are now tempted to compare together the weather of the arctic and antarctic circles. There have opportunely come to hand a few reports from vessels off the coasts of Alaska and Patagonia. A letter published in the San Francisco Chronicle of October 8 from the fleet of whalers in the Behring Sea, dated August 14, 1895, states that—

> On sailing northward in July from Unalaska ice was met within about 100 miles, and was always present until reaching Port Clarence, and that it had never before been seen so near to Unalaska by any one. From Port Clarence to Point Barrow the vessel's progress was exceedingly slow on account of the drifting ice, scarcely a mile having been made in the first fifteen days of August. The northeast wind that usually keeps this ice off shore has been wanting.

Dr. Sheldon Jackson, agent for the Bureau of Education, reports a similar experience by the revenue cutter *Bear* while north of Behring Straits. The southern edge of the arctic ice pack had remained so far south as to prevent any passage north of Icy Cape from July 19 to August 22. Parties from Point Barrow who had traveled down the coast for their mail, report that the past winter, 1894–95, had not been very cold, the lowest temperature being —30°. (See the National Geographic Magazine for January, 1896.)

We are not to infer from the above that there has been unusual cold or an unusual quantity or thickness of ice, but simply that the wind failed to counteract the ocean currents that drifted the ice on shore.

From the Los Angeles Express of Nov. 26, 1895, we learn that the British ship *Anglesey* arriving at San Francisco on that date, like every other vessel that has arrived at that city after rounding Cape Horn during the summer and autumn of 1895, reports an unusual quantity of ice in that region, and corresponding unusual storms and freezing weather and snow. Usually a northwest wind drives the antarctic ice southward, just as a southwest wind drives the arctic ice northward.

We may infer that there has, during the past July and August, been a diminished tendency to northwest winds near the antarctic circle, while, at the same time, there was a diminished tendency to northeast winds in northern Alaska.

As the winds in northern Alaska are associated with the low pressure area in Behring Sea the abnormal wind conditions indicate an abnormal condition of that low area, and, in fact, it was probably at this time almost entirely obliterated by an unusual northward extension of the great high area of the North Pacific, which area also brought cold weather to the Pacific Coast States.

As the westerly winds at Cape Horn represent a general circulation around the low area of the Antartic Continent, and as the winds at the Cape are usually northwesterly, blowing outward from the high pressure area of the South Pacific, we must infer that the absence of northwest and the presence of southwest winds in this region implies a diminished activity of the high area in the South Pacific.

Now, this tendency to an increased activity of the northern area is but an exaggeration of what ordinarily takes place in the changes from January to July, or winter to summer, in the Northern Hemisphere; similarly, the tendency to a diminished activity of the southern high area is an exaggeration of what takes place in that region in the transition from July to January (winter to summer) in the Southern Hemisphere. Both these changes are, therefore, in harmony with those variations in the general circulation that depend upon the interactions of oceans and continents. The change in the North Pacific area is that which would be produced by an increased contrast of land and water in the northern summer, and the change in the South Pacific high area is that due to a diminished contrast between land and water in the southern winter season. Therefore, in the north, or summer, the continental air has been warmer than the oceanic air, but in the south, or its winter, the continental has been cooler than the oceanic air in the region of high pressure. Both of these changes may be plausibly traced back to some one single cause, such as an increased dryness of the atmosphere, which makes hotter summers and colder winters. Although the latter suggestion may not present the true cause in this specific case, yet it often may be applicable to similar cases, and it seems to enforce the general principle that widespread and persistent seasonal variations of climate may result from a very slight general disturbance in the quantity of moisture in the air, or an excess of ascending or descending movements in the atmosphere.

THE LOCAL STORM OF SEPTEMBER 8 IN KANSAS.

The map of Sunday, September 8, at 8 p. m., shows a general movement of the wind from south and southeast over Texas, Missouri, Illinois, Indiana, and thence northward to North Dakota. This movement may be considered in either of its aspects, viz, either as a flow of air towards a special low pressure in Alberta, or as a flow toward the high, warm tableland constituting the eastern slope of the Rocky Mountains. A barometric pressure of 29.7 or 29.8 prevailed over the greater part of the Plateau Region, and a temperature of 80° or 90° prevailed from Nebraska south and east over the Gulf States, with generally clear weather. As there was no strongly developed low pressure, therefore the local showers that occurred, with thunder and lightning, during the 8th and 9th, must be considered, not as an essential part of a system of cyclonic circulations, but as local incidents due more particularly to special local influences. The locations of such storms, with reference to the center of low pressure, has but little significance as compared with their locations relative to the winds and local topography. However, an exception must be made in respect to the storm that occurred on the 8th, a. m., in Morris and Lyon counties, Kans., and moved thence southeastward to the southeast corner of the State into